



OFFICE OF INSPECTOR GENERAL

Audit Report

2014-IT-B-002

Audit of the Board's Data Center Relocation

February 7, 2014

BOARD OF GOVERNORS OF THE FEDERAL RESERVE SYSTEM
CONSUMER FINANCIAL PROTECTION BUREAU

Report Contributors

Robert McMillon, OIG Manager

Rebecca Rider, Project Leader and Auditor

Adam Scheps, IT Auditor

Peter Sheridan, Senior OIG Manager

Andrew Patchan Jr., Associate Inspector General for Information Technology

Abbreviations

A/E	architecture and engineering
Board	Board of Governors of the Federal Reserve System
FRB Richmond	Federal Reserve Bank of Richmond
GAO	U.S. Government Accountability Office
IT Division	Division of Information Technology
OIG	Office of Inspector General
MOU	memorandum of understanding
ROM	rough order of magnitude
TCO	total cost of ownership



Executive Summary:

Audit of the Board's Data Center Relocation

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Purpose

The Board of Governors of the Federal Reserve System (Board) has undertaken a project to relocate its data center from the Board's Martin Building in Washington, DC, to the Baltimore Branch of the Federal Reserve Bank of Richmond (FRB Richmond). Given the magnitude and significance of the project, we plan to monitor it as the project continues through 2015. The objective of this initial audit was to obtain information and gain an understanding of the project's scope, cost, and schedule. We plan to issue subsequent reports at key future dates.

Background

The Board's data center relocation is a major element of the third theme in the Board's *Strategic Framework 2012–15*. The data center currently resides in the Board's Martin Building, which the Board plans to completely renovate. The multiyear data center project is composed of four overlapping phases, with completion scheduled for December 2015. The Board approved an overall budget of \$201.5 million for the project and established a high-level timeline for the project. Further, FRB Richmond has designated a project manager to oversee the design and build-out of the data center, and the Board has designated several key individuals and teams to monitor and provide input into key decisions.

Findings

Overall, we observed that the Board is following a structured approach to planning the relocation of the data center, and Board staff is actively engaged in the planning and decisionmaking for the project. The Board has executed a memorandum of understanding with FRB Richmond for the construction of the new data center and is maintaining a project management team and oversight group to monitor progress and risks.

We identified two areas for which additional actions by the Board are needed to keep the project progressing to meet requirements and schedule. First, the Board has not reevaluated the overall funding for relocating the data center since initially approving the consultant's cost projection of \$201.5 million as the overall budget for the project. This figure was an initial estimate of project costs based on rough order of magnitude pricing used to analyze alternatives rather than a detailed budget for the project. Since the initial estimate, design changes have occurred. Second, the construction phase of the data center relocation project has an aggressive schedule with several identified risk areas that may impact the Martin Building renovation schedule.

Recommendations

We recommend that the Director of the Division of Information Technology reevaluate the data center relocation budget, taking into consideration the design changes that have occurred, and implement a process for updating the budget as additional cost information is available. Further, the updated budget should clearly separate build-out and operations expenses to allow for separate tracking and monitoring through the duration of the project. We also recommend that the Director of the Division of Information Technology continue to closely monitor data center relocation project schedule risks and identify and analyze possible approaches for responding to potential delays that could affect the Martin Building renovation project. In her response to our draft report, the Director of the Division of Information Technology agreed with our recommendations and outlined actions that have been taken, are underway, and are planned to address our recommendations.

Access the full report: <http://www.federalreserve.gov/oiq/files/Board-Data-Center-Relocation-Feb2014.pdf>

For more information, contact the OIG at 202-973-5000 or visit <http://www.federalreserve.gov/oiq>.

Summary of Recommendations, OIG Report No. 2014-IT-B-002

Rec. no.	Report page no.	Recommendation	Responsible office
1	5	Reevaluate the data center relocation budget, taking into consideration the design changes that have occurred, and implement a process for updating the budget as additional cost information is available. The updated budget should clearly separate build-out and operations expenses to allow for separate tracking and monitoring through the duration of the project.	Division of Information Technology
2	8	Continue to closely monitor data center relocation project schedule risks and identify and analyze possible approaches for responding to potential delays that could affect the Martin Building renovation project.	Division of Information Technology



OFFICE OF INSPECTOR GENERAL
BOARD OF GOVERNORS OF THE FEDERAL RESERVE SYSTEM
CONSUMER FINANCIAL PROTECTION BUREAU

February 7, 2014

MEMORANDUM

TO: Sharon Mowry
Director, Division of Information Technology
Board of Governors of the Federal Reserve System

FROM: Andrew Patchan Jr. *Andrew Patchan Jr.*
Associate Inspector General for Information Technology

SUBJECT: OIG Report No. 2014-IT-B-002: *Audit of the Board's Data Center Relocation*

Attached is the Office of Inspector General's report on the subject audit. Given the magnitude and significance of the data center relocation project, we plan to monitor the Board's data center relocation as the project continues through 2015. The objective of this initial audit was to obtain information and gain an understanding of the project's scope, cost, and schedule.

We provided a draft of our report to you for review and comment. In your response, included as appendix B, you stated that you agreed with our recommendations and you outlined actions that have been taken, are underway, and are planned to address our recommendations.

We appreciate the cooperation that we received from received from Board personnel during our audit. Please contact me if you would like to discuss this report or any related issues.

Attachment

cc: Donald Hammond
Michell Clark
Geary Cunningham
Raymond Romero
Glenn Eskow
Jonathan Shrier
William Mitchell

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Introduction

Objective

The Board of Governors of the Federal Reserve System's (Board) project to relocate its data center is a major element of the third theme in the Board's *Strategic Framework 2012–15*.¹ This multiyear project is composed of four overlapping phases, with completion scheduled for December 2015. Given its magnitude and significance, the Office of Inspector General (OIG) plans to monitor the Board's data center relocation as the project continues through 2015. The objective of this initial audit is to obtain information and gain an understanding of the project's scope, cost, and schedule. We are issuing this first report as build-out of the new data center is beginning. We plan to issue subsequent reports at key future dates.

Background

The Board's data center provides the infrastructure that makes data and information technology available to the Board and to the Federal Reserve System for monetary policy, financial supervision, consumer protection, and economic research. The data center currently resides in the Board's Martin Building, in Washington, DC, which the Board plans to completely renovate. With this planned renovation, the Board decided to evaluate its data center operations and options for improving the data center.

The Board contracted with a third-party consultant to develop a business case, which was released in 2011, to improve and/or relocate the primary data center. The business case compared the following eight options for the data center:

1. maintaining the existing data center in its current state
2. providing improvements to the existing data center
3. relocating the data center within the Board's premises
4. outsourcing the data center and resources to cloud services
5. relocating the data center to a retail colocation facility
6. relocating the data center to a wholesale colocation facility
7. relocating the data center to the Baltimore Branch of the Federal Reserve Bank of Richmond (FRB Richmond)
8. relocating the data center to a leased space maintained and operated by the Board

Four core categories were identified as criteria with which to evaluate the eight options: reliability, operations, political exposure, and cost.

1. The third theme in the Board's *Strategic Framework 2012–15* is as follows: "Ensure a modern, safe work environment that emphasizes the need to maintain data quality and integrity and the importance of enhanced collaboration within the organization and with the public." The Board's *Strategic Framework 2012–15* is available at http://m-fwapp2p.frb.gov/inside/corporate/planning-budget/pdfs/Strategic_Framework_2012_2015_final.pdf.

The analysis and final recommendation were a collaborative effort between the consultant and stakeholders from the Division of Information Technology (IT Division), the Research and Statistics Division, and the Management Division. The final recommendation was for the Board to relocate the data center to the Baltimore Branch of FRB Richmond. The Board acted on this recommendation by approving the scope and funding for this option in June 2012 as part of the Board's strategic plan.

The overall approved funding for the project, which is intended to cover all costs associated with building, migrating, and operating the data center for 10 years, is \$201.5 million. This amount was allocated into three high-level categories:

- \$33.6 million for design and construction
- \$28.5 million for transition and migration
- \$139.3 for operations²

In January 2013, a memorandum of understanding (MOU) was executed between the Board and FRB Richmond that defines the responsibilities relating to the design and build-out of the data center and identifies the space at the Baltimore Branch that the Board leased for the new data center. In March 2013, an architecture and engineering (A/E) firm was hired to provide design services for the data center.

A high-level timeline was established within the MOU, dividing the project into the following four overlapping phases:

- Phase I, Facilities Engineering and Design, scheduled for January 2013 to September 2013, has been completed.
- Phase II, Construction and Space Build-Out, has begun and is scheduled for completion in June 2014.
- Phase III, IT Infrastructure Deployment, has begun and is scheduled for completion in March 2015.
- Phase IV, Production Migration of IT Services to New Data Center, is scheduled for July 2014 to December 2015.

FRB Richmond is responsible for the build-out of the data center and has designated a project manager to oversee the design and build-out of the data center. The Board has designated several key individuals and teams to monitor and provide input into key decisions. The Board has designated a program manager and a project manager, both within the IT Division, to oversee the project in coordination with a team composed of members with experience in information technology as well as procurement and financial management, among other areas. There is also an Executive Oversight Group to oversee the status of the project, provide senior-level guidance and consultation, and ensure that the Board's strategic objectives are being met. The Executive Oversight Group is chaired by the Director of the IT Division and includes a representative from FRB Richmond as well as representatives from the IT Division, the Management Division, the Division of Financial Management, the Research and Statistics Division, and the Division of Reserve Bank Operations and Payment Systems.

2 . Figures do not total to \$201.5 million due to rounding.

Summary of Findings

Overall, we observed that the Board is following a structured approach to planning the relocation of the data center, and Board staff is actively engaged in the planning and decisionmaking for the project. The Board has executed an MOU with FRB Richmond for the build-out of the new data center and is maintaining a project management team and oversight group to monitor progress and risks. The project manager is monitoring the project, and the project team maintains a risk register to identify and document risks that may affect the project. In addition, the Executive Oversight Group is providing senior-level guidance and consultation to ensure that the Board's strategic objectives are being met.

We identified two areas for which additional actions by the Board are needed to keep the project progressing to meet requirements and schedule. First, the Board has not reevaluated the overall funding for relocating the data center since initially approving the consultant's cost projection of \$201.5 million as the overall budget for the project. This figure was an initial estimate of project costs based on rough order of magnitude (ROM) pricing used to analyze alternatives, rather than a detailed budget for the project. To ensure adequate funding for all phases of the project, we believe that the budget should be reevaluated, taking into consideration the design changes that have occurred.

Second, the construction phase of the data center relocation project has an aggressive schedule with several identified risk areas. Because the data center currently resides in the Martin Building, the data center construction project must be completed within a certain time frame for the Martin Building renovation to proceed as scheduled. Any changes to the proposed data center construction schedule may affect the Martin Building renovation schedule. We believe that the Board should analyze possible approaches for responding to potential delays that could affect the Martin Building renovation project.

Finding 1: Data Center Relocation Project's Overall Budget Has Not Been Reevaluated

The Board has not reevaluated the overall funding for relocating the data center since it initially approved the consultant's cost projection of \$201.5 million in June 2012 as the overall budget for the project. This cost projection was a 10-year total cost of ownership (TCO) estimate based on ROM pricing that was intended to compare the financial impact of the eight alternatives, rather than to serve as a detailed budget for the selected alternative. The U.S. Government Accountability Office (GAO) has issued guidance concerning the limitations of ROM estimates as budget-quality estimates for capital program costs. Since the initial budget was approved, an A/E firm has been selected and the Board has finalized the data center's design, which includes increases in leased space from the initial estimates. As the actual build-out work begins, additional changes and cost increases are possible, which could potentially affect the budget. Additionally, both the build-out and operations costs are being funded by the overall budget; therefore, any change in one component will have to be absorbed elsewhere within the overall budget. Without reevaluating the overall data center budget, the approved \$201.5 million may not provide for adequate funding to build and operate the data center over the next 10 years.

Overall Budget Was Based on an ROM Estimate

The overall budget for the data center relocation was based on the consultant's business case, which represented a 10-year TCO estimate prepared using conceptual ROM estimates that were ± 30 percent. The intent of the ROM analysis was to help the Board understand the investment required and the related operating expense impacts of the various options. Further, the consultant that developed the business case also recommended in its report that the Board develop a budget for the project as a next step. GAO developed the *GAO Cost Estimating and Assessment Guide* to establish a consistent methodology that is based on best practices and that can be used across the federal government for developing, managing, and evaluating capital program cost estimates.³ The *GAO Cost Estimating and Assessment Guide* states that ROM estimates are helpful for examining differences in high-level alternatives to determine which are most feasible; however, because these estimates are developed from limited data and in a short period of time, an ROM analysis should not be considered a budget-quality cost estimate.

Leased Space Has Increased

Since the overall budget was approved, the Board has selected a final design for the data center that added additional leased space, which may result in higher costs to build and operate the data center. The consultant's business case estimated 7,000 square feet of raised flooring and 6,300 square feet of additional support equipment space. However, the consultant's business case TCO estimate only included costs associated with 7,000 square feet

3. U.S. Government Accountability Office, *GAO Cost Estimating and Assessment Guide: Best Practices for Developing and Managing Capital Program Costs*, GAO-09-3SP, March 2009.

of leased space. In March 2013, an A/E firm was selected to perform the design work for the new data center. The firm worked on several options, and in May 2013 the Board selected a final design requiring approximately 13,000 square feet of leased space, which met both the recommendation of the A/E firm and the total required space noted by the consultant's business case. The Board estimated an increase to operating costs as a result of the nearly doubling of the consultant's estimate of leased space, but the overall budget has not been adjusted from the initial \$201.5 million. The GAO guidance states that after a cost estimate has been accepted and approved, it should be updated periodically as the program matures and as schedules and requirements change.

Build-Out and Operations Funding Are Tracked Together to the Overall Budget

The overall budget is intended to cover all costs associated with building, migrating, and operating the data center for 10 years. As a result, funding for build-out of the data center is being monitored in combination with the funding for data center operations to the overall budget. Officials informed us that any cost increases in one component, such as the build-out, would have to be absorbed elsewhere within the overall budget, potentially affecting the operations budget.

Conclusion

The approved data center relocation budget was based on the consultant's business case, which represented a 10-year TCO estimate prepared using conceptual ROM estimates that were \pm 30-percent. Since the initial budget was approved, a final design has been selected that includes more leased space, yet the overall budget has not been reevaluated to reflect this information. Additionally, build-out and operations expenses are funded together and continue to be tracked to one overall budget number. The budget should be reevaluated, with build-out and operations costs tracked separately, to ensure adequate funds for all phases of the project.

Recommendation

We recommend that the Director of the IT Division

1. Reevaluate the data center relocation budget, taking into consideration the design changes that have occurred, and implement a process for updating the budget as additional cost information is available. The updated budget should clearly separate build-out and operations expenses to allow for separate tracking and monitoring through the duration of the project.

Management's Response

The Director of the IT Division stated that she agrees in principle with the recommendation and that the IT Division has taken actions to implement a process for reevaluating and updating the project status on a monthly basis based on project changes and tracking project expenditures in three separate categories, including design and construction, transition and

migration, and operations. Further, periodic budget meetings are held with the Chief Financial Officer and the Chief Operating Officer. Finally, project expenditures are tracked against the total project budget and reflected in quarterly performance reports.

OIG Comment

In our opinion, the actions described by the Director are responsive to our recommendation. We plan to follow up on the division's actions to ensure that the recommendation is fully addressed.

Finding 2: Data Center Relocation Project's Schedule Could Affect the Martin Building Renovation Schedule

The construction phase of the data center relocation project has an aggressive schedule with several identified risk areas that could lead to delays, and some key milestone dates for the data center relocation project have shifted. For the Martin Building renovation to proceed as scheduled, the Board's data center construction project needs to be completed within a set time frame. Any changes to the proposed schedule for the construction of the new data center may affect the Martin Building renovation schedule.

Data Center Construction Schedule Is Aggressive and Timelines Overlap With Those of the Martin Building Renovation

Officials recognize that the construction phase of the data center relocation project has an aggressive schedule. According to the high-level timeline, the construction and space build-out phase is scheduled to be completed in a relatively short 12-month time frame, from July 2013 to June 2014. Additionally, the initial planning schedule for the Martin Building renovation project and completion of the data center project has a 6-month overlap.

The data center relocation schedule calls for construction to be completed by June 2014, with the IT Infrastructure Deployment phase scheduled from January 2014 through March 2015 and the Migration of IT Services phase from July 2014 through the project's completion date at the end of 2015. Construction work on the Martin Building is currently scheduled to begin in late June 2015, during data center migration. During this 6-month overlap period, the Board plans to limit Martin Building renovations to minor construction. Although the data center relocation project team is monitoring schedule, budget, and resource risks to the project, delays in the data center schedule could affect the Martin Building renovation project.

Milestones Have Shifted

Some key milestone dates for the data center relocation project have shifted. Project files indicated that the award of the construction contract to the general contractor initially was planned for July 2013. As of April 2013, the general contractor award was scheduled for the end of September. In August 2013, the planned award date was rescheduled to November 1, 2013. The general contractor was issued a letter of intent on November 6, 2013, and the contract was awarded on December 4, 2013. These changes resulted from (1) the Board's delay in selecting and approving a final floor plan and (2) the Board's revision of the MOU with FRB Richmond to reflect additional leased space, which led to a later date for the completion of the construction drawings. Because the data center is currently located in the Martin Building, delays to its completed migration could affect the start of the Martin Building construction.

Data Center Relocation Team Is Monitoring Risks

We observed that officials have taken actions to identify and document risks to the project's schedule. Further, officials informed us that they have initiated some tasks early to proactively manage the timeline, such as performing some demolition in advance of the general contractor award and planning to preorder long-lead-time equipment so that it will be available in time for the contractor to install.

To track risks to the schedule and other project risks, the project team is maintaining a risk register. The risk register is a document that lists risk items identified for the data center relocation project. It provides a description of the risk, assigns a probability and level of impact for the risk, and identifies a primary contact/assignee. Comments on the status of the risk and actions taken relating to each risk are also included. In particular, we noted that the risk register included FRB Richmond's award of the construction contract and the timely approval of planned electrical upgrades by the electric company and the City of Baltimore.

Conclusion

The construction phase of the data center relocation project has an aggressive schedule, with a six-month overlap between completion of the data center migration and commencement of the Martin Building renovation. Some key milestone dates have shifted, and program officials have tracked these dates as well as other schedule risks on the risk register. Because the Martin Building renovation project schedule depends on the timely completion of the data center migration, we believe that contingency plans should be developed in the event that delays begin to impact the Martin Building renovation schedule.

Recommendation

We recommend that the Director of the IT Division

2. Continue to closely monitor data center relocation project schedule risks and identify and analyze possible approaches for responding to potential delays that could affect the Martin Building renovation project.

Management's Response

The Director of the IT Division stated that she agrees with the recommendation and that action has already been taken to monitor project schedule risks and to identify possible approaches to mitigating the impact of potential delays. Extensive project governance and communication strategies involving dependent project stakeholders have been established.

OIG Comment

In our opinion, the action described by the Director is responsive to our recommendation. We plan to follow up on the division's actions to ensure that the recommendation is fully addressed.

Appendix A

Scope and Methodology

The scope of this initial audit included reviewing the budget for the data center relocation and the MOU between the Board and FRB Richmond, as well as obtaining background information on the project, including schedules and the interdependencies of the data center relocation and the Martin Building renovation projects. Our scope did not include an analysis of the final decision to relocate the data center to FRB Richmond's Baltimore Branch. We did not evaluate the specific criteria used to compare the different options considered by the Board regarding the future of the data center, nor did we assess the validity of those options.

To accomplish our objective, we reviewed the Board's *Business Case for Data Center Strategy*, which was prepared by a consultant, and the MOU between the Board and FRB Richmond. We also reviewed the Board's budget documents and supporting documentation relating to cost estimates for the data center, strategic plans, project charters, organizational charts, project schedules, the project's risk register, and status reports provided to us by the Board's Data Center Relocation Manager.

We reviewed the *GAO Cost Estimating and Assessment Guide* and a Board Budget Q&A document. We also reviewed a prior OIG management letter related to the Martin Building renovation.⁴

We interviewed IT Division and Management Division personnel who are involved in the data center relocation, and we conducted a site visit to FRB Richmond's Baltimore Branch to meet with both Board and FRB Richmond personnel and to tour the space selected for the data center. We participated in teleconferences held to discuss the design of the data center, and we reviewed meeting minutes and other documents associated with the design of the data center. We conducted our fieldwork from April 2013 to September 2013.

We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

4. Office of Inspector General, *Audit Observations on the Board's Planning and Contracting Process for the Martin Building Construction, Renovation, and Relocation of Staff*, OIG Report No. 2013-AA-B-007, March 29, 2013, http://www.federalreserve.gov/oig/files/FRB_Martin_Building_Planning_Contracting_Mar2013.pdf.

Appendix B

Management's Response



BOARD OF GOVERNORS OF THE FEDERAL RESERVE SYSTEM
WASHINGTON, DC 20551

DIVISION OF
INFORMATION TECHNOLOGY

January 23, 2014

Mr. Mark Bialek
Office of Inspector General
Board of Governors of the Federal Reserve System
Washington, DC 20551

Dear Mark:

We have reviewed your report entitled "Audit of the Board's Data Center Relocation" prepared as part of your office's review of the implementation of the Board's Strategic Framework.

We appreciate the report's findings that the IT Division is following a structured, well thought out, approach to the planning of the relocation of the data center. As you know, the data center relocation budget which is embedded in the Board's Strategic Framework, represents a ten year projected cost of operating a production data center as well as the cost of migrating to the new facility. While we agree, in principle, with your first recommendation to reevaluate the data center relocation budget, this must be done in accordance with Board budget policy. Any change to this budget is subject to Board budget approval, consistent with the Board's budget process and guidelines. While the Director of IT can influence this discussion, the director has no budget approval authority. With this as clarification, we have already taken actions to implement a process for re-evaluating and updating the project status on a monthly basis based on project changes, and track project expenditures in three separate categories including, design and construction, transition and migration, and operations. As part of project monitoring, we periodically hold budget meetings with Bill Mitchell, Chief Financial Officer and Don Hammond, Chief Operating Officer. Finally, project expenditures are tracked against the total project budget and are reflected in the quarterly performance reports provided to the CBA.

We agree with your second recommendation and have already taken action to continue to closely monitor project schedule risks and to identify possible approaches to mitigating the impact of potential delays. Extensive project governance and communication strategies involving dependent project stakeholders have been established.

www.federalreserve.gov

We appreciate the professionalism and courtesies provided by the staff of the Office of Inspector General during the review, and we look forward to working with your office in the future. Thank you for the opportunity to provide comments on this report.

Sincerely,



Sharon Mowry
Director, Information Technology

cc: Andrew Patchan
Donald Hammond
Bill Mitchell
Michell Clark
Geary Cunningham
Ray Romero



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